4.0 HEXACHLOROBENZENE/BENZO(A)PYRENE (HCB/B(A)P)

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Progress Toward Challenge Goals

U.S. Challenge: Seek by 2006, reductions in releases, that are within, or have the potential to enter the Great Lakes Basin, of HCB and B(a)P from sources resulting from human activity.

Canadian Challenge: Seek by 2000, a 90 percent reduction in releases of HCB and B(a)P from sources resulting from human activity in the Great Lakes Basin, consistent with the 1994 COA.

The U.S. has taken steps toward the goal of seeking (unquantified) reductions of HCB and B(a)P releases to the Great Lakes Basin. Figure 4-1 illustrates the trends in HCB air and water releases reported to TRI from 1990 to 2000. Figure 4-2 illustrates approximate HCB emission reductions achieved in the U.S. from 1990 to 1997, by source category, both with and without the assumption that all of the HCB contaminant in pesticides is released subsequent to the pesticide application. While US EPA uses a volatilization rate of approximately 8 percent in inventory calculations, recent studies suggest that 100 percent of the HCB contaminant volatilizes.[1,2] Figure 4-3 presents estimated B(a)P emissions in the Great Lakes Basin for 1996, 1997, and 1998, by source category, as reported by the Great Lakes Regional Air Toxic Emissions Inventory project. This inventory reflects emissions from eight Great Lakes states and the Province of Ontario.

The latest release inventory estimates show that Canada is making progress toward its 90 percent reduction goals. Between 1988 and 2001, Canadian releases in the Great Lakes Basin have been reduced approximately 65 percent for HCB (Figure 4-4[3]), and 48 percent for B(a)P (Figure 4-5[4]).

Workgroup Activities and the 4-Step Process

Emission Inventories

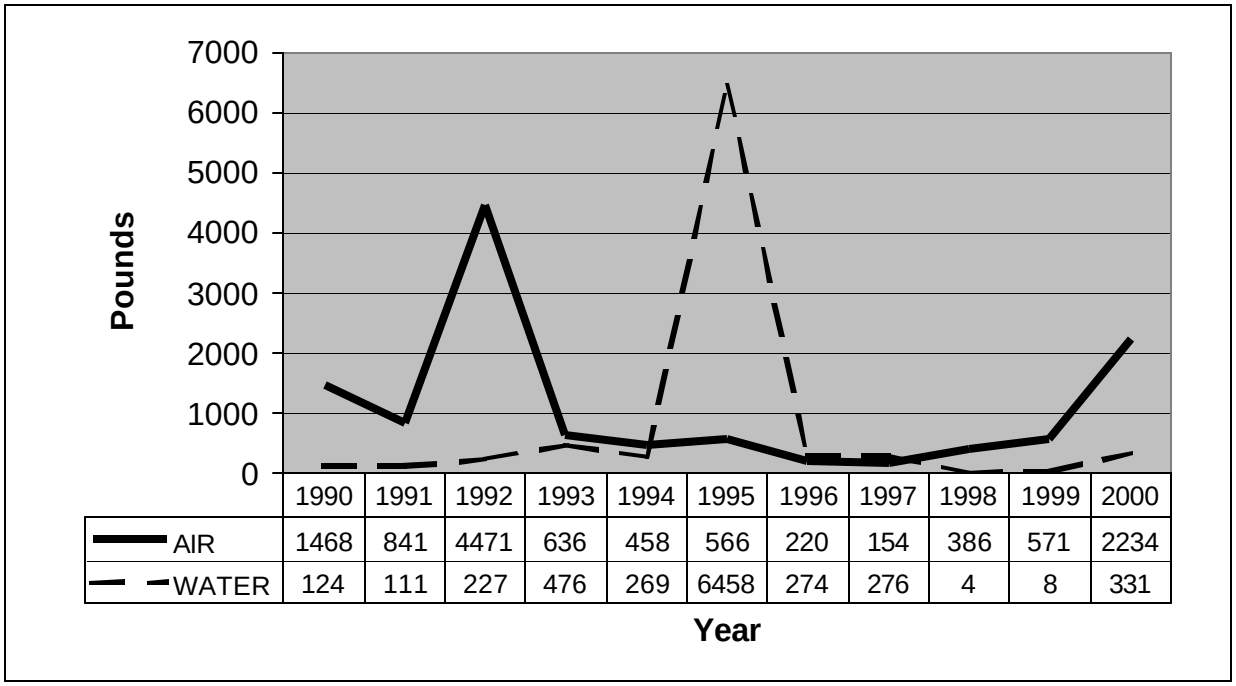
Efforts to resolve disputed HCB emission levels from utility coal combustion and rubber tire manufacturing continued in 2002. A review of test data indicates that utility coal combustion does not appear to be a significant source of HCB, and the Rubber Manufacturers Association has performed testing which has shown that rubber tire manufacturing is not a source of HCB.

[1] Benazon Environmental Inc., "Hexachlorobenzene Sources, Regulations and Programs for the Ontario Great Lakes Basin 1988, 1998, and 2000 Draft Report (No.1), July 13, 2000" prepared for Environment Canada.
[2] Bailey, R.E. (2001) Global hexachlorobenzene emissions, Chemosphere 43:167-182.
[3] Ontario HCB release estimates in the Great Lakes Basin are based on the "Hexachlorobenzene Sources, Regulations and Programs for the Ontario Great Lakes Basin 1988, 1998, and 2000 Draft Report (No.1), July 13, 2000" prepared for Environment Canada by Benazon Environmental Inc., and updated with facility release data from the National Pollutant Release Inventory.
[4] Ontario B(a)P release estimates in the Great Lakes Basin are based on the "B(a)P/PAH Emissions Inventory for the Province of Ontario 1988, 1998, and 2000 Draft Report (No.1) May 16, 2000" prepared for Environment Canada by Benazon Environmental Inc., and updated with facility release data from the National Pollutant Release Inventory.

In the U.S., a MACT standard for primary aluminum plants has reduced emissions of B(a)P and other air toxics released during the production of molten aluminum metal. B(a)P emissions from the single primary aluminum plant located in the Great Lakes, the Alcoa plant in Indiana, have been reduced to approximately 150-250 pounds per year. Also, the petroleum refining sector expressed concern that the B(a)P release estimates for fluid catalytic cracking units had been grossly overestimated. A subsequent review of test results confirmed that these units are no longer major B(a)P sources in the basin.

U.S. Step 1 & 2 B(a)P and HCB reports on sources and regulations and a Step 3 report on reduction options have been completed and posted on the Binational Toxics Strategy website. In addition, a draft addendum to the HCB Step 1 and 2 report has been prepared to incorporate the 1996 National Toxics Inventory results. US EPA's 1996 National Toxics Inventory (NTI) was released around September 2000. This is especially significant because it was prepared using a "bottom-up" approach in which the States determined emission levels from sources located within their boundaries using a common set of emission factors that were used by all States. US EPA and the Workgroup have been going through the 1996 NTI to check the accuracy of the HCB emission levels and to identify any emission reduction opportunities.

Draft HCB and B(a)P (including polycyclic aromatic hydrocarbons, or PAHs) release inventories for Ontario were circulated to CGLI workgroup members and affiliates for review and input in 2000. New facility release data for years 2000 and 2001 have since become available through Canada's National Pollutant Release Inventory (NPRI), which now requires lower micro-pollutant reporting threshold levels. This new information has been used to update the HCB and B(a)P inventories for Ontario.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
AIR	1468	841	4471	636	458	566	220	154	386	571	2234
WATER	124	111	227	476	269	6458	274	276	4	8	331

Figure 4-1. Trends in U.S. HCB Air and Water Releases Reported to TRI from 1990 to 2000, lbs/year[5]

[5] Data from EPA's TRI database, accessed October 2002.

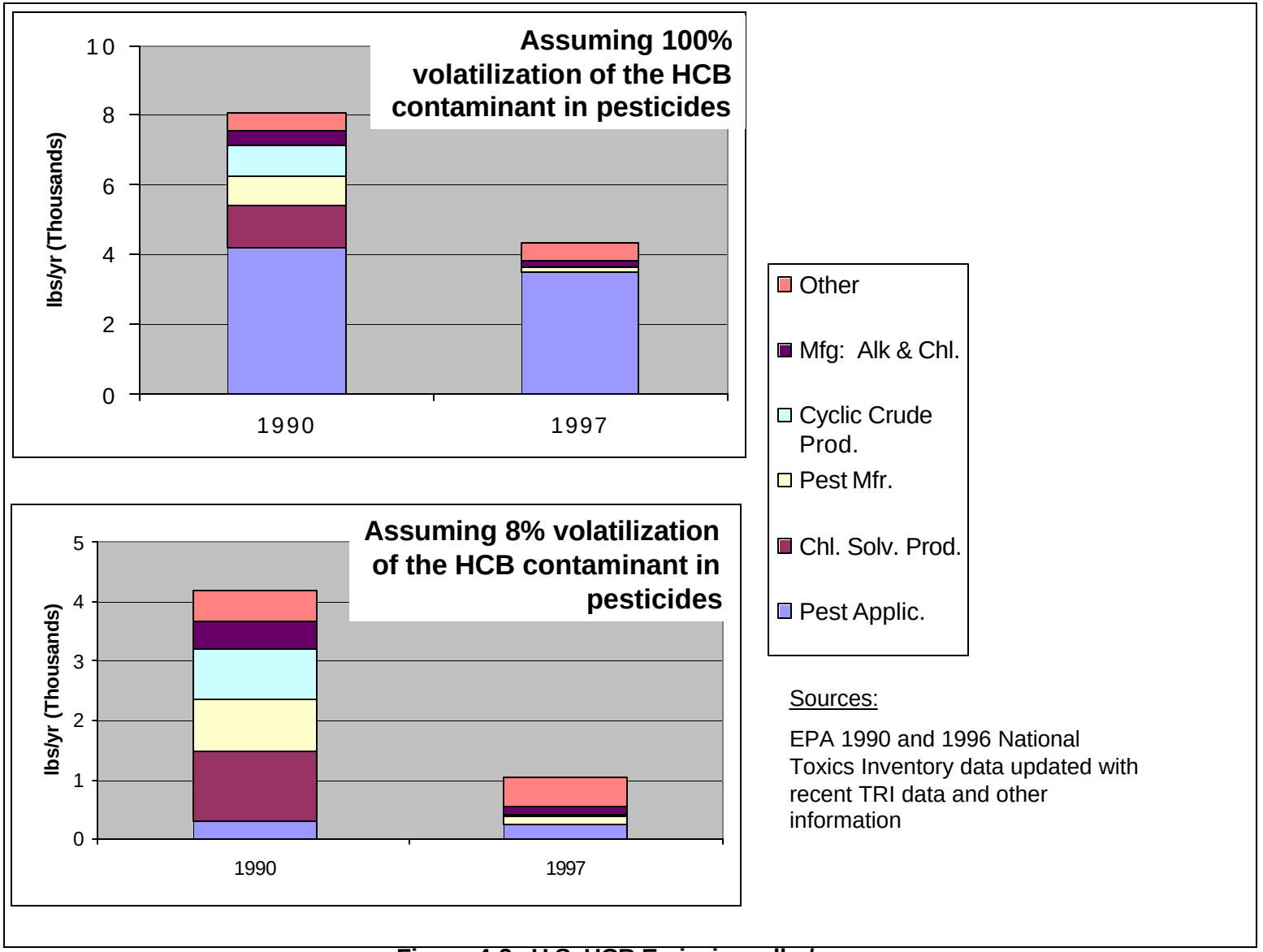


Figure 4-2. U.S. HCB Emissions, lbs/year

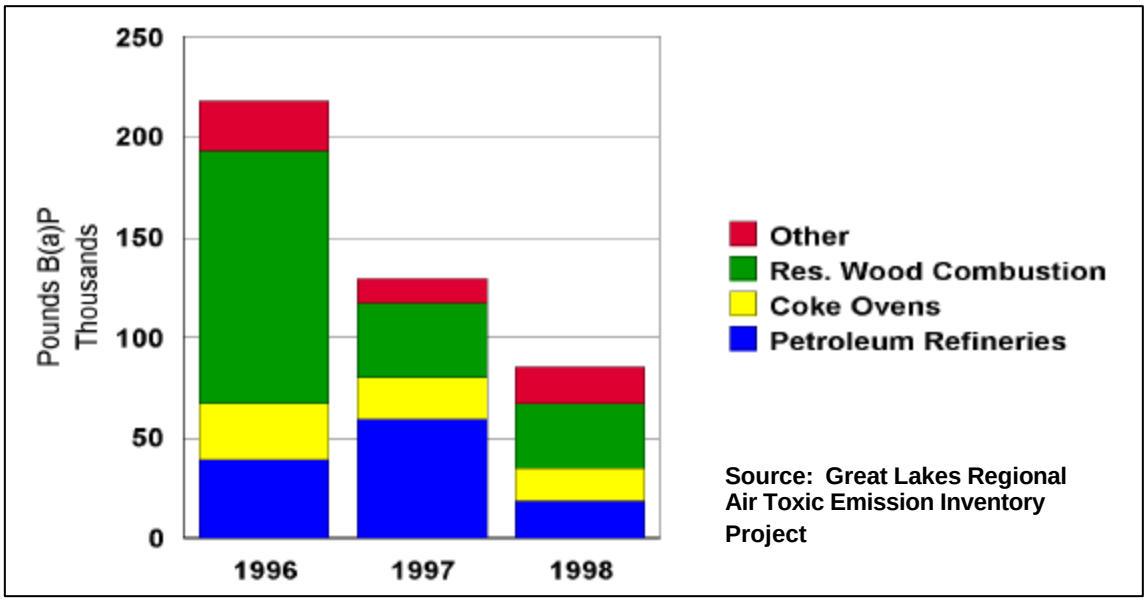


Figure 4-3. B(a)P Emissions from the States and Province around the Great Lakes, lbs/year

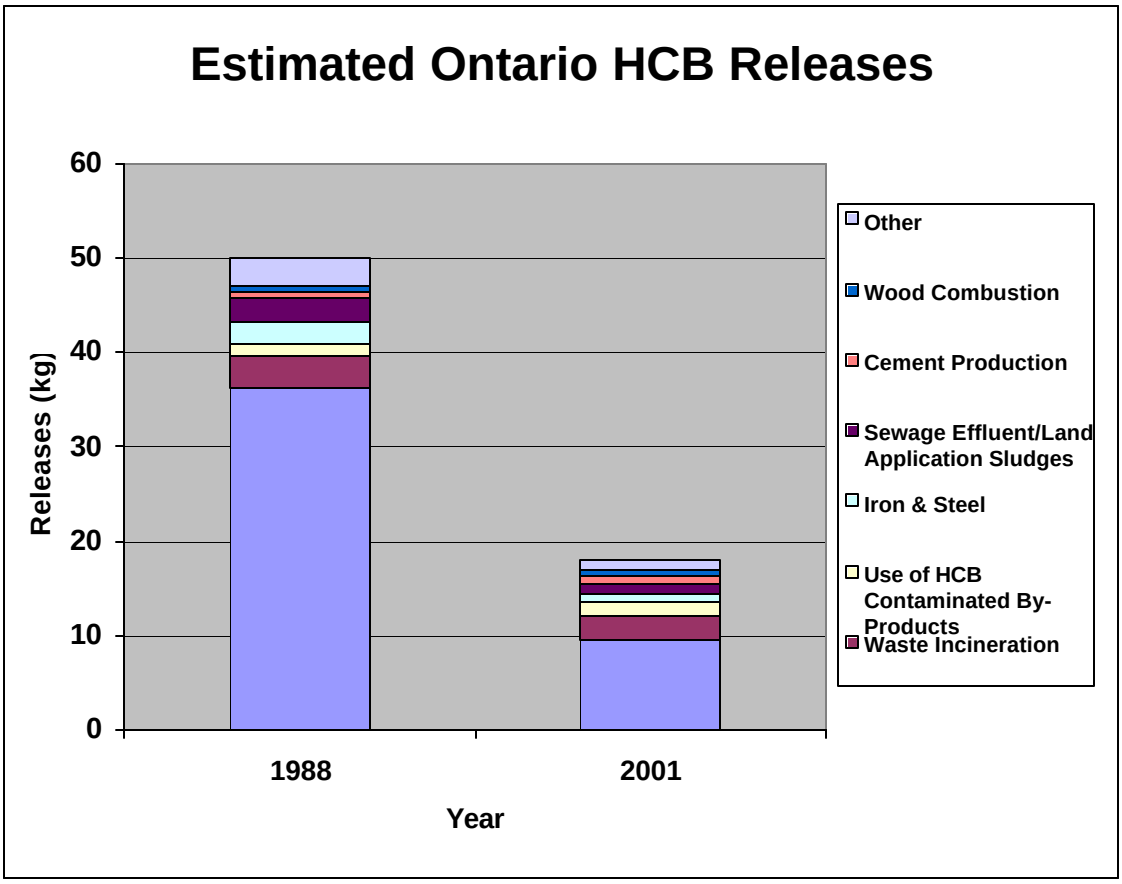


Figure 4-4. Estimated Reductions in HCB Releases (kg/year) in Ontario from 1988 to 2001, by Sector

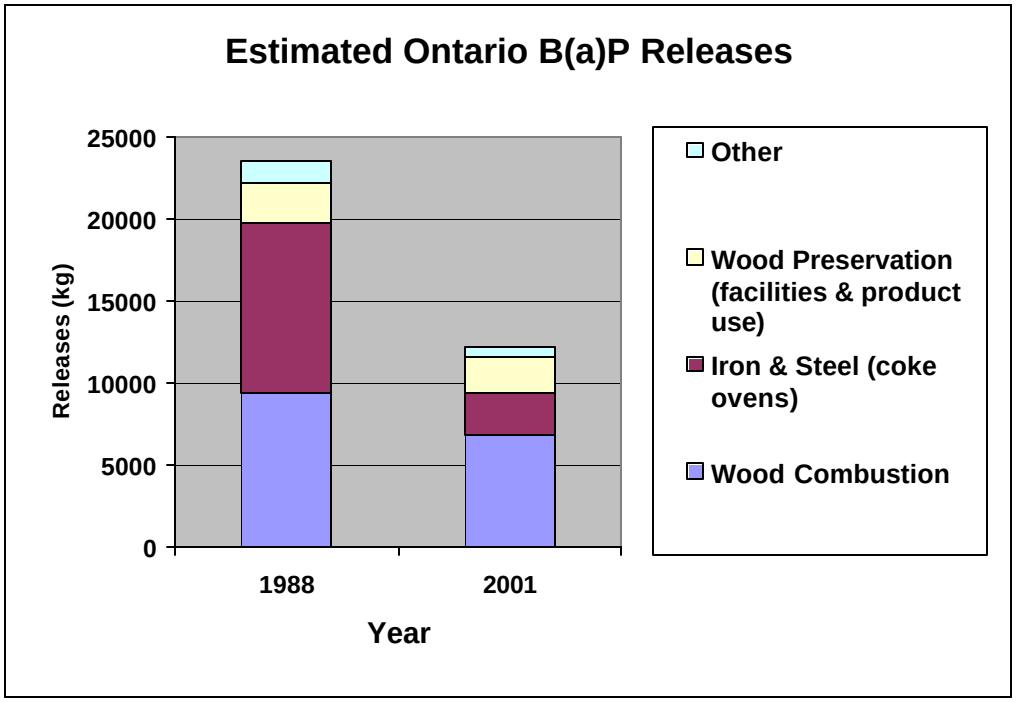


Figure 4-5. Estimated Reduction in B(a)P Releases (kg/year) in Ontario from 1988 to 2001, by Sector

A review is underway to confirm the current significance of trace HCB levels in some seven pest control products following manufacturers' initiatives over the last decade to reduce HCB levels. Estimates using maximum US EPA HCB product content limits and assuming all applied HCB is volatilized suggest that pesticide application is the overwhelming source of HCB release in the Great Lakes Basin. Protecting the confidentiality of business information on product formulation/use, while deriving more accurate release numbers for the sector, is at the center of ongoing discussions between pesticide manufacturers and various government agencies. The HCB Workgroup has received assistance from the Pesticide Workgroup and pesticide manufacturers in an effort to resolve this important issue,.

Voluntary Stack Testing

Ten Ontario facilities have responded thus far to the call for voluntary stack testing (base-metal smelters, steel mill and foundry, hospital incinerators, cement plant). Testing was completed at the Toronto Hospital for Sick Kids, Falconbridge-Kidd Creek, Wescast Industries, Norampac (pulp mill), Hamilton Health Sciences 9 Biomedical Incinerator, and Upper Canada Cemeteries (crematoria). This Environment Canada initiative will continue to focus on facilities where little or no accurate release data are available.

Scrap Tires

Millions of scrap tires burned in several catastrophic U.S. fires in 1999. More than 800 million scrap tires accumulated in stockpiles throughout the U.S., present a potential threat to human health and the environment. Tire fires are typically caused by wildfires, lightning strikes and arson. These fires are nearly impossible to extinguish and can burn for months, generating B(a)Ps in considerable air emissions, groundwater contamination and oily runoff. The scrap tire managers for the Great Lakes States and the Scrap Tire Management Council were contacted to learn how each state is handling its scrap tires and potential ways that these fires can be minimized.

Reduction Activities

Wood Stoves

The purpose of a wood stove change-out program is to encourage people to turn in pre-1992 wood stoves for newer wood stoves that meet US EPA standards or for pellet or gas stoves. A wood stove change-out program is the most effective way to reduce B(a)P emissions from residential wood combustion because US EPA-certified stoves generate only about 15 percent of the emissions of older stoves, which account for about 90 percent of existing wood stoves. "The Great Wood Stove & Fireplace Change-out Program," held in 2001 in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, New York, North Dakota, Ohio, South Dakota and Wisconsin, at least 1,200 old stoves or stove inserts were replaced.

Building on Natural Resources Canada's pilot "Burn it Smart!" campaign, the national roll-out of the program commenced in 2002. Across Canada, a series of evening workshops will be provided to help Canadians who heat with wood, or who use it for recreational purposes, to make their wood-burning habits safer, cleaner, and more efficient. Free residential wood burning workshops will be held in 28 regions across Canada between September 2002 and March 2003. The following is a list of the four participating regions in Ontario, and a non-governmental organization that is organizing the workshops:

- Blue Mountain Cottagers - The Environmental Network
- Central Ontario Cottagers - Canadian Centre for Pollution Prevention (C2P2)
- First Nations Communities of Southern Ontario - Elora Center for Environmental Excellence
- Southern Ontario - Elora Center for Environmental Excellence

Each organization will sponsor a minimum of 12 workshops spread throughout many locations in southern and central Ontario. A demonstration "burn trailer" is often used outside a workshop venue to showcase the difference between the old and new technologies in wood stoves. A website has been set up for the campaign at www.burnitsmart.org.

This is an extremely important program because residential wood combustion contributes over 50 percent of the B(a)P emitted to the Great Lakes Basin. Persuading Great Lakes residents to turn in their old wood stoves and inserts for cleaner burning appliances, whether US EPA-certified wood stoves or gas or pellet burning appliances, is one of the most effective strategies

for achieving reductions.

Environment Canada is considering how best to increase the profile of the campaign in Ontario in order to maximize public participation, which will hopefully increase the number of old wood stoves that are replaced.

Voluntary Actions

In January 2001, an Environmental Management Agreement (EMA) between Environment Canada, Ontario Ministry of the Environment, and Algoma Steel (a major Ontario steel mill) was finalized and signed. Under the EMA, Algoma agreed to develop a facility-based approach to address environmental priorities. The project is similar to Dofasco's EMA and is expected to bring about significant reductions of priority substances, including B(a)P.

Four facilities reporting HCB releases to US EPA's TRI have reported reductions in HCB emissions. These reductions are a result of facilities shutting down HCB-emitting operations (e.g., magnesium processing) or refining their emission estimates through stack testing or improved sampling methods.

Standards Development and Implementation

Canada Wide Standards (release limits) have been developed for mercury, particulate matter, ozone, and benzene. CWS are being finalized for dioxins and furans. Implementation of CWS by the major source sectors and the province is expected to bring about HCB and B(a)P release reductions in the next 5-15 years.

Canadian Environment Ministers have agreed to undertake joint initial actions by 2005 to reduce emissions from residential wood burning appliances by: (1) updating standards for new wood-burning appliances; (2) exploring options for the development of a national regulation for new, clean-burning residential wood heating appliances; (3) developing and implementing a national public education program on residential wood combustion; and (4) assessing options for a national wood stove upgrade or change-out program.

Recommendations from two Strategic Option Reports for the iron and steel and wood preservation sectors are in place. Audits against the Codes of Good Practice have been conducted for all three pentachlorophenol (PCP) and creosote facilities in Ontario. Based on the audit assessment findings, each facility has developed a 5-year implementation plan, to improve environmental performance. These plans were submitted by December 31, 2001, in accordance with the deadline set out in the voluntary program. Facilities now are implementing their plans to meet the objectives of the Codes. Codes of practice for the iron and steel sector have been finalized for implementation by the Ontario steel mills.

A US EPA-proposed rule to control emissions of toxic air pollutants during hydrochloric acid production is expected to reduce HCB emissions.

Next Steps

The HCB and B(a)P Workgroup will continue to fill data gaps and obtain voluntary reductions from major source sectors. A critical area being focused on is the application of pest control products, where there is an urgent need to confirm HCB release numbers. If current release numbers are correct, an effective reduction strategy must be developed with stakeholders. In addition, wood combustion appears to be the dominant source of B(a)P in the basin. Increased efforts will be made to promote and support wood stove change-out initiatives and other campaigns underway to reduce wood-smoke pollution. Although B(a)P inventories indicate significant reductions, ambient levels of B(a)P in the Great Lakes have been fairly constant since the early 1990's, indicating a need to better identify B(a)P emitting sources.

Achieving reduction targets will prove challenging since many of the remaining sources are at trace levels and are ubiquitous across a number of sectors associated with fuel and waste combustion processes. Significant technological and societal changes are needed to effect meaningful reduction.